Ultralightweight PV Array Materials for Deep Space Mission Environments, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Photovoltaic arrays for future deep space NASA missions demand multiple functionalities. They must efficiently generate electrical power, have very large areas and very low areal mass densities, mechanical flexibility to allow them to be compactly stowed and deployed in space, and the ability to simply survive and operate in the deep space environment. The objective of this NASA program is to develop ultra low mass density fabric materials with patterned conductive traces capable of conducting high electrical current densities and able to survive the harsh thermal and mechanical environmental conditions required by deep space missions. Such multifunctional Gossamer materials would provide both adequate mechanical support and low loss electrical interconnect network functionalities for power generation arrays. NanoSonic won one of NASA's 13 "nanotechnology product awards" for 2006, recently announced in NASA Technical Briefs, for its electrically conducting and mechanically flexible Metal Rubber

TM

sheet materials. The proposed program would build on this successful Metal Rubber

TM

technology to synthesize patterned, electrically conductive, low-weight fabrics rather than sheet materials. During Phase I, NanoSonic would produce prototype high performance, ultra low mass density support fabrics with integrated patterned electrically conductive vias and demonstrate properties, and demonstrate the feasibility of large-scale rapid production of such materials.

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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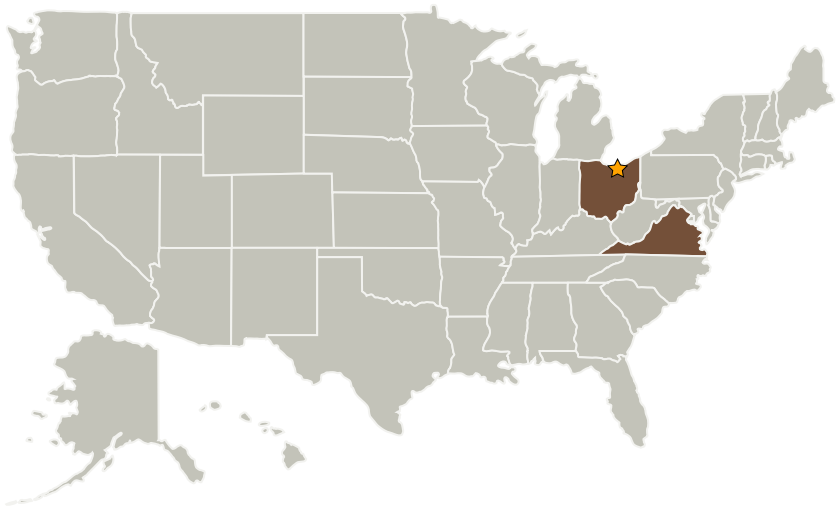
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Nanosonic, Inc.	Supporting Organization	Industry	Pembroke, Virginia

Primary U.S. Work Locations	
Ohio	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines